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FURTHER NOTES ON ALBERTA LEPIDOPTERA, WITH DESCRIPTION OF A NEW SPECIES.

BY F. H. WOLLEY DOD, MIDNAPORE, ALTA.

(Continued from page 8.)

620. *Agrotis bollii* Grt.?—One female at light, September 3rd, 1904. This is the specimen mentioned by me in Can. Ent., XXXVII, p. 58, Feb., 1905, as "darker and less clearly marked" than *Euxoa mollis*, from which I can easily distinguish it now that I know the latter species better. Grote described the species as *Agrotis hilaris* from a Texas male, which is in the British Museum, but he afterwards found the name preoccupied in the genus in Europe, and substituted *bollii*. Sir George Hampson, however, placing the European and North American *hilaris* in different genera, restores the prior name, which Grote never altered on the type label. The type has a black collar, which my specimen has not, and lacks a dark brown costal mark near the apex possessed by mine, which is also less grey and has the orbicular of different shape. There were no other specimens in the British Museum. A female from Huachuca Mountains, Ariz., in Smith's collection, I think the only one he had standing as *bollii*, appeared more like mine, and also lacked the black collar.

621. *Noctua acarnea* Smith.—(Journ. N. Y. Ent. Soc. XIII, 194, Dec., 1905).

Described from a single male taken by Mr. Sanson at the Banff Museum on July 11th, 1902. I examined the specimen in Smith's collection in January, 1910, and took very careful notes thereon, as it appeared quite distinct from anything I had previously seen. Nor could I, until just before writing the present article, discover anything which might be it amongst the material sent me for naming from time to time by Mr. Sanson. But by good fortune I have before me at this moment a male in good condition taken by him on an electric light pole on July 4th, 1914, and submitted to me just in time for recording here.

It fits Smith's description and my notes exactly, with the exception that I should not call the discoidal spots in the recent capture "large," and the space between them is scarcely darker than the ground. The expanse is 36 mm., a trifle smaller than the size given of the type. It would never have occurred to me to associate the species with *bicarnea* at all. In type of maculation it comes much nearer to *dislocata* Sm., but the colour differs entirely, being very even "dark, almost blackish brown, with a purplish tinge," except for bright, pale carneous patagia, and a carneous shade in and round the reniform. The apparent purplish tinge is probably really due to slight iridescence. All the tibiae are spined, the fore tibiae on the inner side only, as is often the case with *dislocata* and *calgary*. I was unable, however, to discover any spines on the fore tibiae of the type, but noted that they were not in a position easy for examination. The antennæ are minutely ciliate, and in the recent capture at any rate, rather heavily scaled as well. The eyes are without lashes. The head and thorax are thickly clothed with rough hair only, without crests. The wing form and general build is like *dislocata*, in which the antennal structure is similar except that *dislocata* has fewer scales, and rather longer ciliations. The thoracic vestiture is rather rougher than in *dislocata*. As far as these characters go, it seems referable to *Episilia* Hbn., which is used by Hampson as prior to *Pachnobia* Gn. and *Choephora* Grt. It appears to me that both *calgary* and *dislocata*, if not some others which Hampson refers to *Agrotis*, fit better with *Episilia*, as both have loose hairy vestiture without obvious crests. But *acarnea* has one structural peculiarity not hitherto observed in any North American genus referred to the Agrotids except *Trichorthosia*, to which this is quite distantly related. The eyes are sparsely and finely hairy. I mentioned this to Prof. Smith after examining the type, but he was unable to find the hairs and told me that I was mistaken. If I had not been very sure of my point, however, I should not have taken a note on the fact, and on examining the eyes of the recent capture I find the same. The hairs are not easily noticeable, I admit, and anyone might be excused for overlooking them. They are most easily seen in strong sunlight. They are not much easier to find in some specimens of *Perigea alfkenii*, though they are finer in *acarnea*.

than in that species. The apparent general relationship to *dislocata* and *calgary* led me to expect to find that these might have hairy eyes, but an examination of a considerable number of specimens has failed to reveal any.

622. *N. bairdii* Smith.—(Journ. N. Y. Ent. Soc. XVI, 84, June, 1908). Described from a single female taken at High River by Mr. Thomas Baird. I saw and took notes on it before Fletcher recognized it in Mr. Baird's collection as something strange and sent it to Smith. Smith says after the description: "There is no very near ally to this species. It belongs obviously to the *lubricans* series, and stands next *atricincta*, than which it is much larger, quite different in ground colour and without the obvious transverse lines. So far as they go, however, the lines in *bairdii* correspond in position with those of *atricincta*." I saw the specimen for the second time at Rutgers College, and noted that it was "rather like a large *digna*. Possibly an ally of *exuberans*. Certainly not *atricincta*." I have certainly never met with another specimen in Alberta that could be this species.

623. *N. vocalis* Grt.?—Banff, July 30th, 1910. N. B. Sanson. In 41st Rept. Ent. Soc. Ont. for 1910 (page 10 of the "Record") I erroneously recorded this specimen as *vernalis*. I corrected the error in Ent. News, XXIV, 361, Oct., 1913, and on page 360 I followed Dr. Dyar in citing *planifrons* and *congrua* as synonyms. From my notes I judge my No. 623 to have been *vocalis*, though I cannot be quite sure of it until I see the specimen again. It was most certainly not *vernalis*. (q. v. No. 618).

624. *Chorizagrotis boretha* Smith*—(Journ. N.Y. Ent. Soc., XVI, 86, June, 1908). Described from three males and a female from Kaslo, B. C. I have seen a male and female type in the Rutgers College collection. A note after Smith's description states that it is allied to *terrealis*, and in a general way resembles *perexcellens*. I believe that the supposed relationship to *terrealis* was based on an erroneous identification of that species, and failed to notice any resemblance to *perexcellens*. I have two perfect females taken on my place here on Pine Creek, on Aug. 16th, 1901, and Aug. 27th, 1905, exactly alike, and beyond all doubt one species, which I have never yet succeeded in closely associating

*Breeding results have now shown that Nos. 225 and 244 of this list are one species, *sordida* Smith, and in all probability forms of *boretha*.

with anything else listed by me in this series of papers. One of these I have compared with the types of *boretha* and labelled it "Like female type but greyer." On this comparison I base the present record, but it may be as well to remark that my notes state that "The male type is almost like some *ochrogaster*." Whereas my two females bear not the slightest resemblance to any *ochrogaster* that I ever saw, my note seems to suggest that either the range of variation in *boretha* is very wide, or that the female type is not really the same species as the male.

The same Pine Creek female I also compared with the unique female type—lacking abdomen—of *Porosagrotis thanatologia* Dyar, from Kaslo, which I found in the Washington collection. (Proc. U. S. Nat. Mus., XXVII, p. 833, 1914—"Kootenai List"). I noted that it was probably the same species, but my specimen did not match it sufficiently closely to justify making a positive reference.

625. **Rhizagrotis querula** sp. nov.—Head, collar, thorax, and primaries uniform pale fuscous brown, faintly olivaceous, sparsely irrorate with darker scales, but without any streakiness or contrast in shades. *Lagena*, to which the new species is closely allied, has the inferior portion of the collar paler than any other part of the insect, and the upper portion contrastingly dark brown, these two shades being divided by a black line, absent in *querula*. *Lagena*, in all its observed variations is longitudinally streaky, the most conspicuous streaks consisting of long, inwardly dentate or sagittate dark brown marks on the termen, which contrast with the intervening pale streaks bordering the dark veins, especially on 1, 3, 4, and 7. In *querula*, though there is a faint indication of a series of dark subterminal shades in the interspaces, most evident in the male type, but entirely lacking in the female, the actual terminal space is in all six specimens very slightly paler than that immediately preceding it. In *querula* the conjoined discoidal spots, though outlined by a pale shade and partially defined by black scales, have not the whitish annuli of *lagena*, and unlike those of that species, are not contrasted by a darkening of the cell before and below them. A fine black basal streak is present in all but one, and all show indications of dark t. p. lines, produced to points on the veins, and in two of the males they are well marked, continuous, some specimens showing a faint t. a. line as well. But

these are occasionally discernible in *lagena*. In *querula* the secondaries of both sexes are slightly dull, and in the male lack the clear whiteness of those of *lagena*. Antennæ and all superficial structural characters, as in *lagena*. Expanse: Male 38-44 mm.; female 46 mm. (equalling *lagena* in size).

Described from five males and one female from the Red Deer River, about 50 miles to the north east of Gleichen, Alta. July 1st and 3rd, 1905; and July 23rd and 24th, 1907. All but one in good condition. Taken by Mr. A. F. Hudson and the author at dusk at snowberry flowers, and at treacle.

Types.—♂ in the collection of the author, ♀ in that of Dr. Wm. Barnes. I have made three of the remaining four males co-types.

This is the species which I recorded under the name *lagena* in 37th Rept. Ent. Soc. Ont. for 1906, p. 94, 1907, and 38th Rept., p. 121, 1908 (page 9 of the "Record" for 1907). It is possible that it may turn out to be merely a variety of that species, though I have nothing suggesting an intergrade, and have no record of *lagena* from Canada. The type of *lagena* is a female from Nevada, and is figured by Hampson. I have compared it with one of my Utah specimens, of which I have a long series. I have it also from Colorado, New Mexico, and Arizona, and it is recorded from Montana.

626. **Feltia volubilis** Harv.—I have three males and a female which I took at the Chalet lights, Laggan, on July 17th and 18th, 1907, and Mr. Sanson took a male at Banff on about June 24th, 1914. One of the males I have compared with the male type from New York in the British Museum, and found it a very close match. It is of the dark red-brown form figured by Hampson, but differs from all my eastern specimens of that form in having the secondaries uniformly dark. I have one Washington and one Oregon specimen with secondaries pale as in the eastern form. On the other hand, all my eastern examples of the paler and greyer *stigmosa* have uniform dark secondaries in both sexes. Holland's Plate XXII, fig. 23, is of this latter form. The two forms appear to be now universally accepted as one species, though I can find no record that both have ever been bred from one. Specimens from some localities certainly appear about intermediate. For instance, I

have Manitoba males which belong to neither extreme, but have the centrally pale subhyaline secondaries of typical *volubilis*.

I have a Kaslo male exactly like those from Laggan. Other Kaslo specimens have vinous red shades contrasting with a pale, sometimes almost violaceous grey ground, like typical *vancouverensis* from Vancouver Island. But study of a long Kaslo series has left me in serious doubt as to whether *vancouverensis* and *volubilis* are really distinct. A somewhat intermediate form is that named *semiclarata* by Grote, of which the type is from Washington Territory. I have compared a Kaslo male with it, and found it to match exactly. A Corvallis, Oregon specimen, perhaps a trifle nearer to typical *vancouverensis* than is *semiclarata*, I have compared with Strecker's three female types of *atha* from Seattle, Washington, and believe it to be the same.

As a rule a good point of distinction between *vancouverensis* and *volubilis* is in the subterminal line. In the former this is more or less distinct, crenulate, with a fairly well marked and not very deep W. In *volubilis* it is often lacking, or when faintly indicated is sharply dentate, with a W reaching clear to the margin. But this character does not always hold, and where colour characters fail, as is so often the case in the material from the mountain districts inland, a positive reference to either *vancouverensis* or *volubilis* is not always possible. Dr. Dyar apparently met with this difficulty when, in the Kootenai List, after recording the capture of seventy-five specimens of *vancouverensis*, he follows them up with only one of *volubilis*, adding: "This seems to me only an extreme form of *vancouverensis*." (Proc. U. S. Nat. Mus., XXVII, p. 832, 1904). I should add that I have examined other Kaslo material of this group besides that in my own collection.

627. *Porosagrotis orthogonia* Morr. var. *delorata* Smith. The North-western Canadian form of *orthogonia* was described as a species as *delorata* by Smith in Journ. N. Y. Ent. Soc., XVI, p. 87, June, 1908, from a single male taken at High River by Mr. Baird. Mrs. Nicholl had taken a male which stands in the British Museum collection labelled "B. C. prairie 1. IX. 07," though the specimen is recorded by Sir George Hampson, under *orthogonia*, in Can. Ent. XL, p. 102, March, 1908, as from "Alberta prairie." From the date, and knowledge of Mrs. Nicholl's movements, I should judge

Alberta to be its most probable origin. I had for some years previously had a couple of specimens in my collection from Regina, Assa. In the spring of 1911 "cutworm" larvæ were reported as doing very serious damage to fodder and field crops in Southern Alberta, round Lethbridge, Monarch, etc. (42nd Rept. Ent. Soc. Ont. for 1911, p. 94 [p. 6 of the "Record"]—1912). Larvæ sent to the Experimental Farm at Ottawa produced specimens of *delorata* on Aug. 14th and 20th of the same year, the specimens being sent to me for determination. I received a couple more males from Mr. Baird labelled High River, Sept. 1st, 1911, and have seen two pairs taken by Mr. J. B. Wallis at Lethbridge on Aug. 23rd to 26th, 1912. *Orthogonia* was described from Glencoe, Nebraska. I have specimens from Colorado, and a very large number from Utah. The few Canadian specimens I have seen have all been more uniformly dark olivaceous in tone than is usual with southern examples, and have wholly dark secondaries. Morrison's type, which I have not seen, had the "markings well expressed," and secondaries whitish inwardly. Pale secondaries are usual in my southern series, but some have them very nearly as dark as Canadian specimens, and differ scarcely if at all as to primaries. In short, comparing Alberta specimens with some of my darkest from Colorado and Utah, there is really no difference worthy of remark. I should never have considered the darkest forms to be worthy of a varietal name, but as one has been named, let *delorata* stand for a dark olivaceous variation of *orthogonia* without pale shades and with wholly dark secondaries in the male. I have previously explained that the *orthogonia* recorded by me with a query as No. 236 in my original notes (Can. Ent., XXXVII, p. 53, Feb. 1905) was a different species. I now believe that specimen to have been a badly worn and bleached *ridingsiana*.

628. *Euxoa rabiata* Smith.—(Trans. Am. Ent. Soc., XXXVI, p. 255, Nov., 1910). Described from six males and two females from Volga, South Dakota; Colorado; and Calgary, one of the females being from the latter place, and dated Aug. 29th. I happen to have taken some notes on a group of specimens standing separated in Smith's collection, from which, or from a selection of which the description referred to was subsequently made. Judging from these notes in conjunction with the description, I think it very

probable that the name refers to *dargo* Strecker (No. 237 of this list), or to a mixture of that and *niveilinea*. The latter species I have never taken.

629. **E. dolens** Smith.—(Can. Ent., XXXVIII, p. 226, *Setagrotis*, July, 1906); syn. *quinta* Smith (Ann. N. Y. Acad. Sci., XVIII, p. 97, *Euxoa*, Jan., 1908). *Dolens* was described from a male and two females from Beulah, Man., and Arrowhead Lake, B. C. I saw a pair of types in Smith's collection, the male from Beulah, and the female from Arrowhead Lake. *Quinta* was described from three males and two females from High River (Baird), and Kaslo (Cockle), and I have seen a type from the former locality in Smith's collection. I made the reference in my notes after direct comparison of the types, and Smith admitted its correctness to me personally. It is a close ally of and agrees structurally with *scandens* Riley, which Hampson places in *Lycophotia* Hbn. Both species lack the tuberculate frons of *Euxoa*. Compared with *scandens* the newer species is darker, has more distinct t. a. and t. p. lines, and uniform dark secondaries. I have a defective male from High River, dated September 7th, 1908. The dates given under the description of *dolens* are Arrowhead Lake, June 8-15, and Beulah, Aug. 28th. Under *quinta*, Kaslo, June 1st, 30th, and July 7th and 10th. No dates to the High River types.

Quebecensis was described from a single female from Quebec, and referred doubtfully to *Setagrotis*. I have seen the type in the Washington Museum, and though I had nothing with which to compare it, I believe that this will be found to be a prior name to *dolens*.

630. **E. septentrionalis** Walk.—A male at Lethbridge on Aug. 21st, 1912, by Mr. Wallis. This is the only example taken in Alberta that I have seen, which I have been quite certain was this species, and all the records I have seen under the name from other places in Canada east of the Rockies have proved erroneous upon investigation. It is a species sometimes very closely resembling *messoria*, so closely in fact as to make separation very difficult, but it is undoubtedly distinct, as listed by Hampson, who correctly makes *incubita* Smith a synonym. It is sometimes very common on Vancouver Island. Another very closely resembling, though smaller species, is *pestula* Smith. (My Nos. 249 and 265).

[631. **E. rufula** Smith.—In Prof. Smith's collection I found a specimen marked "rufula Smith Xd type," and bearing label "Ft. Calgary, N. W. B. C." Smith told me, however, that the accuracy of the label was doubtful. That is to say, that it is doubtful whether the specimen was really taken at Calgary, which, though formerly a fort, was never in B. C. *Rufula* is not a synonym of *infausta* as listed by both Smith and Hampson, but is the species figured by Hampson, I think erroneously, as *basiflava*.]

632. **E. compressipennis** Smith.—A female taken at Banff, at light, on Aug. 19th, 1909. In 41st Rept. Ent. Soc. Ont. for 1910 (page 11 of the "Record"), 1911, I recorded the specimen as *basiflava*, and an added note says: "This was described from N. W. B. C. *Compressipennis* was described from Yosemite, B. C. The types are identical." That note unfortunately contains two inaccuracies. *Compressipennis* was described from Yosemite, California, which I feel convinced was the statement that I sent into print. But "the types are identical" was my own unguarded statement. What I should have said was that the male type of *compressipennis* in the Washington Museum was absolutely identical with the female type of *basiflava* in the same collection. The latter was described from "North West British Columbia" (possibly meaning the Alberta Rockies—who can tell?), I think from a single pair only. I had previously seen the male type also in the Neumoegen collection in the Brooklyn Museum, and do not feel confident that it is the same species, and must therefore modify my positive reference until I can positively identify the male type.

633. **E. obeliscoides** Gn. and var. *infusa* Smith.—*Infusa* was described as a species from two males, from Cartwright, Man., and Black Hills, Wyo. The Cartwright specimen is the type in the Washington Museum. The other I have not seen. A note after the description adds: "The species is really *obeliscoides* without the contrasting costa, and with the t. p. line lost so that there is an almost even shade below the cell from t. a. line to outer margin; the terminal space being scarcely deeper. The ground colour and general variation in tint are as in *obeliscoides*, but the species is perceptibly smaller."

Obeliscoides is not rare at Cartwright, and most specimens that I have seen from there entirely lack the red-brown shades of

Guenée's type and of Grote's *sexatilis*. I have no note as to whether the type of *infusa* lacks them, and they occasionally exist in Manitoba specimens, but it was not on their absence that the supposed species was based. The costa is not usually very contrasting and occasionally the t. p. line is very indistinct, so I suppose Smith's name should stand for a rather small form possessing these characters, which are not characteristic of the prairie race as a whole.

I have a female taken here on September 2nd, 1907, to which the varietal name seems applicable, and have seen a male of the species taken at Lethbridge by Mr. Wallis on August 8th, 1912.

It is practically impossible to distinguish some Manitoba females from some of that sex of British *obelisca* Hbn. in my possession, though North American males appear to have finer antennal serrations than males of *obelisca*.

634. *E. colata* Grt.—I saw a male in Smith's collection labelled "Laggan, 6,800 ft.," presumably from Bean. A male taken by Mrs. Nicholl at 8,000 ft. on Wilcox Peak is in the British Museum, and is evidently the same species as the female type there from Mt. Hood, Oregon. A third male, in splendid condition, was taken by Mr. Sanson on the summit of Sulphur Mt., Banff, about 7,200 ft. The species appears to be more closely allied to *mollis* than to *divergens*, with which Grote associated it.

(To be continued.)

SOME CHALCIDOID HYMENOPTERA FROM NORTH QUEENSLAND.

BY A. A. GIRALULT, NELSON (CAIRNS), AUSTRALIA.

(Continued from page 20.)

Family ELASMIDÆ.

Genus *Elasmus* Westwood.

1. *Elasmus margiscutellum*, n. sp.

Female.—Length 1.70 mm.

Dark metallic green, the distal margins of mesopostscutellum and the scutellum margined with lemon yellow. Sides of thorax and legs black, the tegulae, knees, tarsi and distal half or less of intermediate and cephalic femora pale yellowish white, the antennæ

brownish. Abdomen with base concolorous transversely and also the distal fourth, the rather long intervening portion orange yellow marked along each side (from both dorsal and ventral aspects) with a longitudinal row of from 3 to 4 black dots. Wings subhyaline. Mandibles with eleven teeth, the first two large, the others minute. First ring-joint very short. First funicle joint longer than the pedicel, the distal one only slightly longer than the pedicel but longer than any of the club joints.

Male.—Not known.

Described from one female captured by sweeping the forest growths on Mount Pyramid (1500—2500 feet), June 2, 1913 (A. P. Dodd).

Habitat.—Australia—Nelson (Cairns), Queensland.

Type.—The above female on a tag and a slide with the head.

2. *Elasmus orientalis*, n. sp.

Female.—Length 1.57 mm.

Like *pallidicornis* Girault, but the antennal concolorous with the body, the scape (except slightly above) pale brown and the cephalic tibiae are white; also the knees. Moreover, the funicle joints are subequal, all distinctly longer than wide and each a little longer than the pedicel.

Male.—Not known.

Described from one female captured by sweeping in a jungle, May 18, 1913 (A. P. Dodd).

Habitat.—Australia—Kuranda, Queensland.

Type.—The above specimen on a card or tag.

Family CHALCIDIDÆ.

CHALCITELLINI.

Genus *Chalcitelloides* Girault.

1. *Chalcitelloides nigrithorax*, n. sp.

Female.—Length 2.60 mm.

Black but like the type species (*nigriscutum*) except that only the scape, pedicel and first four funicle joints are red; abdomen blood red, but black above and along upper half of each side (a little proximad of middle), the petiole black; tegulae and legs (except coxae) blood red, the hind femur with a long rounded black spot centrally. Antennae 11-jointed. Fore wings lightly stained.

Funicle joints after the first wider than long, the rather indistinctly sutured first club joint shorter than the other joint of that part; joints of funicle widening distad, the flagellum clavate. Punctures of thorax not densely confluent, separated. (Median carina of propodeum not seen distinctly).

Male.—Not known.

Described from one female captured from a window, November 4, 1912.

Habitat.—Australia—Proserpine, Queensland.

Type.—The above specimen on a tag and a slide bearing the head, a fore and a hind leg.

The antennæ of this genus were originally described as being 10-jointed, but a re-examination of the type, shows that its club is 2-jointed, the black portion being the distal or second joint.

Family AGAONIDÆ.

Genus *Agaon* Dalmar.

1. *Agaon nigriventre*, n. sp.

Female.—Length 2.20 mm., excluding ovipositor, which is exserted for a length about equal to that of the abdomen.

Orange yellow, the posterior margin of the head, flagellum, all of the abdomen except at base, an hour-glass shaped marking down meson of pronotum and cephalic part of scutum (a smaller end cephalad; shaped like an inverted egg-cup), a stripe across apex of thorax (about apex of scutellum), the tegulae and a dot in a line longitudinally with them, cephalad (opposite the apex of the egg-cup-shaped marking) jet black; also the valves of the ovipositor. Agreeing with all the characters of the genus as given by Ashmead, but the mandibles bidentate at apex (but four teeth or even five in all), the antennæ 9-jointed without a ring-joint, the scape hemispherically dilated (foliaceous). First and second funicle joints subequal, longer, longer than the pedicel, which is subequal to the distal funicle joint. Postmarginal vein longer than either marginal and stigmal, the latter shortest. Wings hyaline. Body glabrous.

Male.—Unknown.

Described from one female received from the South Australian Museum, Adelaide, mounted on a card labelled "A. M. Lea."

Habitat.—Australia—Mount Tambourine, Queensland.

Type.—The above specimen, the head on a slide.

Family PTEROMALIDÆ.
SPHEGIGASTEINI.

Eurydinotomorpha, new genus.

Female.—Closely allied with *Eurydinotella* Girault but the abdomen is long, pointed conic-ovate, the second segment occupying only about a fifth (or slightly more) of the surface, the abdomen longer than the head and thorax united. Postmarginal vein very long, over twice the length of the stigmal. First funicle joint longest, longer than the pedicel. Propodeum with abbreviated median and lateral carinae. Parapsidal furrows a little over half complete. Second abdominal segment nearly four times the length of the third, the fourth nearly twice the length of the third, subequal to segment 5, segment 6 a little longer than 4 and 5 while 7 is apparently as long as, or longer than, 2. Petiole distinct, but short. Caudal margin of abdominal segments straight. The genus has the habitus of *Sympiesis* of the Eulophidae.

Male.—Not known.

Type.—The following species.

1. **Eurydinotomorpha pax**, n. sp.

Female.—Length 3.00 mm.

Metallic shining blue, the abdomen æneous green, purple dorsad, the wings hyaline, the venation tarsi, tips of tibiae and scape pale yellow, the femora and tibiae reddish brown, the coxae concolorous. Pedicel and first ring-joint suffused with pallid. First club joint forming over half the club, subequal to the third funicle joint which is a fourth longer than the pedicel. Short white hairs on mesoscutum giving an effect somewhat as is common with species of *Catolaccus*. Head and thorax reticulated, the propodeum more densely so, the network smaller, the abdomen finely so. Funicle and club black.

Male.—Unknown.

Described from one female captured by sweeping in jungle, October 28, 1911.

Habitat.—Australia—Babinda (near Cairns), N. Queensland.

Type.—The above specimen on a tag and a slide with hind legs and the head.

Family MISCOGASTERIDÆ.

PIRENINÆ.

***Erotolepsiella*, new genus.**

Female.—Running to *Erotolepsia* Howard, but the stigmal and postmarginal veins extremely long, subequal, each over three-fourths the length of the marginal, the antennal pedicel somewhat shorter than the solid club, the eyes naked or nearly so. There is a single ring-joint and the first funicle joint is subquadrate and narrower than the others, the second and third joints longest. Fore wings banded. Cephalic femur somewhat swollen, but simple. Mandibles tridentate. Parapsidal furrows complete, delicate. Abdomen pointed conic-ovate, the second segment longest but occupying only about a third of the surface, its caudal margin entire. Propodeum with a neck but with no carinæ, rugose, the scutellum with a not very distinct cross-furrow before apex. Abdomen with a short, stout petiole. Antennæ 11-jointed. With the habitus of the Pteromalidae.

Male.—Unknown.

Type.—The following species.

1. ***Erotolepsiella bifasciata*, n. sp.**

Female.—Length 1.80 mm.

Purplish brown, the tip of the abdomen ringed narrowly with white, the distal part of metathorax and the short abdominal petiole also white. Legs concolorous, the tarsi yellowish white, the antennæ concolorous. Fore wings with two conspicuous black-brown bands across them, the first narrow and from the bend of the submarginal vein, the second very broad and from the stigmal vein. Thorax punctate.

Male.—Not known.

Described from a single female captured by sweeping in jungle, October 28, 1911.

Habitat.—Australia—Babinda, North Queensland.

Type.—The above specimen on a tag and a slide with the head and posterior tibia.

Family CALLIMOMIDÆ.

MEGASTIGMINÆ.

Genus *Neomegastigmus* Girault.1. *Neomegastigmus collaris*, n. sp.

Female.—Length 1.35 mm., excluding the ovipositor, which is about equal to the abdomen in length.

Like *lividus*, but the ovipositor is shorter and the pronotum pale orange yellow; also the legs are whiter, not pale lemon yellow. The scutellum is uniformly sculptured in both species, like the rest of the mesonotum. Also the head is dark orange yellow. Abdomen subsessile.

Male.—Not known.

Described from a single female captured by sweeping in open forest (grasses), March 11, 1912.

Habitat.—Australia—Thursday Island, Torres Strait.

Type.—The above specimen on a tag, the head on a slide.

2. *Neomegastigmus petiolatus*, n. sp.

Female.—Length 1.95 mm., excluding the black exserted valves of the ovipositor, which are about two-thirds the length of the abdomen.

Orange yellow, the abdomen (its short, distinct petiole pallid), propodeum and distal third of scutellum purplish black. Fuscous spot from stigma large, nearly a band across the wing. Caudal margin of segments 2-4 of abdomen incised at meson, the incision large, wide on segment 2, minute on segment 4. Cephalic legs (femur and distad) pale the others concolorous with the abdomen, but all tarsi pale, the antennæ straw yellow; funicle joints all shorter than the pedicel. Thorax densely reticulated and transversely lineolated.

Male.—Not known.

Described from one female captured by sweeping lantana and other bushes in a field near town, October 21, 1911.

Habitat.—Australia—Mackay, Queensland.

Type.—The above specimen on a tag and a slide bearing the head.

3. *Neomegastigmus lividus* Girault.

One female by sweeping lantana and other bushes in a meadow near the town of Mackay, Queensland, October 21, 1911.

IDARNINÆ.

Genus *Philotrypesis* Foerster.1. *Philotrypesis longiventris*, n. sp.

Female.—Length 2.75 mm., exclusive of the ovipositor. Brownish black, the legs including the coxae yellowish brown, the wings hyaline; sides and venter of abdomen yellowish brown. Scape concolorous with the legs, the flagellum black, the black pedicel subequal to the first funicle joint, the next two (joints 2 and 3) funicle joints subequal, each a little shorter than 1; distal funicle joint a little longer than each of the three club joints. Clypeal area yellow. Mandibles bidentate. Body, including propodeum and abdomen, finely scaly, the propodeum without a median carina.

Male.—Unknown.

Described from one female captured by sweeping in a jungle pocket, June 4, 1913.

Habitat.—Australia—Nelson (Cairns), Queensland.

Type.—The above specimen on a tag, the head on a slide.

Genus *Sycoscaptella* Westwood.1. *Sycoscaptella angela*, n. sp.

Female.—Length 2.26 mm., excluding the black ovipositor, which is nearly as long as the body.

Deep pinkish orange, the wings hyaline, the legs and scape concolorous, the flagellum dusky. Three transverse black spots across meson of abdomen, the first smallest, all more or less triangular; also a black dot at meson, apex of fifth segment and which is nearly joined to the narrow black dorsal surface of the (following) two produced or tubular segments of which the second is shorter. Postmarginal vein longer than the stigmal. Propodeum with three delicate sulci at meson, separate, the scutellum simple, but both it and the scutum with a median longitudinal impression. Thorax finely reticulated. Antennæ 13-jointed, three ring and club joints, the funicle joints only slightly longer than wide and more or less equal. Mandibles bidentate.

Male.—Unknown.

Described from one female captured by sweeping in forest, November 6, 1912.

Habitat.—Australia—Ayr, Queensland.

Type.—The above specimen on a tag and a slide with the head.

NOTES FROM OTTAWA.

Mr. H. F. Hudson, Field Officer of the Entomological Branch, in charge of the Entomological Laboratory at Strathroy, Ont., has given up his Entomological work and has joined the First Battery of the Canadian Field Artillery of the Second Contingent which is expected to leave for England for service abroad early in 1915. He is now in training with his company at London, Ont. The good wishes of his many Entomological friends will go with him.

Mr. J. B. Gareau has been appointed a Field Officer and Inspector of the Entomological Branch and commences his duties on January 1st. Mr. Gareau is a graduate of the Quebec Forestry School and during the last two years has been an officer of the Forest Service of British Columbia. He has also studied under Prof. Kellogg at Stanford University, California from which institution he was appointed. Mr. Gareau will continue the work formerly carried on by Mr. Hudson.

POPULAR AND ECONOMIC ENTOMOLOGY.

DEFORMED APPLES AND THE CAUSES.

BY L. CAESAR, GUELPH, ONT.

It is a very common occurrence in almost every district to find apples that are so deformed that they have to be rejected as culls. Neglected orchards have usually, as one would expect, the greater proportion of such fruit; there are, however, exceptions where the best cared-for orchards suffer severely. Although most of the causes of these deformities have now been discovered there are still some cases that have not yet been solved.

Insect Injuries as a Cause.

The chief insects to which malformed apples may be attributed are Plum Curculio, Apple Curculio, Leaf-bugs or Capsids, Aphids, Apple Maggot or Railroad Worm, Leaf-rollers and Green Fruit-worms. Each of these will now be discussed in turn.

Plum Curculio. Many apples and pears are deformed as a result of the egg-laying and early feeding habits of this small snout-beetle. The injury in such cases is done while the fruit is still small. The eggs in these apples or pears either fail to hatch

or the young larvae die very early, because if they live, the fruit almost always falls prematurely. The malformation is due to the tissues immediately around the injured area not growing or growing very slowly while the rest of the apple grows at the normal rate; therefore a depression is produced at the affected part. There are often several such depressions in a fruit. There is usually a scar at the point of injury. Uncultivated and neglected orchards and those bordering on woods or thickets or waste places are regularly much worse attacked than well cultivated and sprayed ones.

Apple Curculio. This is also a snout-beetle. It is smaller than the Plum Curculio, and has a longer and more slender snout.



Fig. 1.—The work of the Apple Curculio. Notice the little holes at the bottom of the punctures and the uniform inverted cone type of the depression.

most parts of Canada, but there are a few counties in which they do much damage.

Leaf-Bugs or Capsids. These insects have in recent years been found to be the cause of a large number of deformed apples in the Northern United States and in parts of Canada. At least five species are now known to cause malformed apples, viz., *Hetero-*

With this it eats deep holes into the fruit for feeding and egg-laying purposes. As in the case of the Plum Curculio, apples usually drop early if the larvae from the eggs hatch and live; otherwise they remain on the tree, but are deformed in the manner shown in the photograph. Note the regular inverted, cone-shaped outline of the depression with the little hole at the apex. This helps in the identification of the injury. Apple Curculios are not very common in

cordylus malinus, *Lygidea mendax*, *Neurocolpus nubilus*, *Paracalacoris colon* and *Lygus invitus*. The injuries in each case are made while the fruit is still small and are caused by the nymphs or young bugs making deep punctures into it with their needle-like mouth

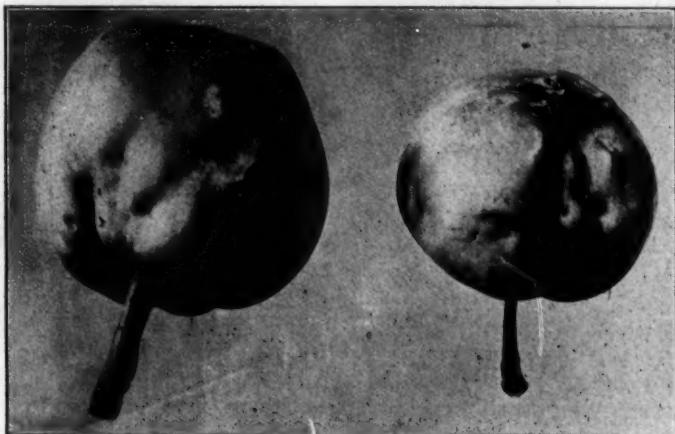


Fig. 2.—Work of Capsids or Leaf-bugs on apples. This is done when the apples are very small.

parts. The juice is sucked out through these punctures. Very severely injured apples usually drop off. The remainder hang on but are often much distorted in consequence of the punctures received. The nymphs of the first two species are red and easily seen; those of the others are usually greenish or brownish green colour, and are more likely to escape observation. The addition of a tobacco extract, such as Black-leaf 40, to the regular Codling Moth spray will do much to destroy these insects.

Aphids. Most fruit growers are familiar with the clusters of small woody, more or less deformed apples caused by these sucking insects. Wherever the aphids feed upon a young apple, they leave little depressions or dimples. In many cases these depressions disappear with the growth of the apple. The peculiar tenacity with which a badly infested cluster of fruit hangs on the



Fig. 3.—Cluster of small, woody, deformed apples, caused by the feeding of Aphids on twigs, leaves and fruit.

tree seems to be the result of the small amount of food and sap that the fruit and fruit stems receive in consequence of the feeding of the insects on the leaves and new growth of the branch that bears the cluster. Such partial starvation produces tough tissues in stems and fruit.

Apple Maggot or Railroad Worm.—If the fruit is only slightly infested with this insect it seldom produces any noticeable deformity except the very small depressions where the eggs are laid, but if the infestation is severe almost every apple on the tree may be rendered unsightly by ridges and bulges on the surface. These are partly the result of numerous egg punctures and partly of the death and therefore failure to grow of tissues here and there just beneath the skin wherever the larvae happened to tunnel when feeding.

Leaf-Rollers and Green Fruit Worms.—These are greenish caterpillars that attack the apples soon after they are formed and frequently eat deep holes in them. As the apples grow these injuries callous over but are often so deep that the fruit is distorted and cannot be marketed. Any other biting insect that eats out similar areas may also cause a deformed fruit.

Other Causes of Deformities.

Although most of the deformities of apples are caused by insects, a number is due to some of the following factors: Frost injury, fungus diseases, imperfect fertilization, Bitter Pit disease or spray injury.

Frost Injury.—Fruit recently set may become partly frozen with the result that the injured area will fail to develop normally and a malformed apple will be produced. It is claimed that frost injury to blossom buds may also cause deformed fruits.

Fungous Diseases. Any fungus disease, such as Apple Scab, which attacks one side of the apple much worse than the other, will by interfering with the growth of that side cause a deformity.

Bitter Pit Disease.—This is a disease of apples due neither to a fungus nor a bacterium, but so far as known to weather conditions. Good growing weather in spring, or early summer

followed by drought, seems in Ontario to be the chief cause. Soil conditions and the individuality of the tree are apparently contributing factors. The disease takes various forms; sometimes the apples look quite sound but, when cut open, are found to have dry dead areas here and there through them; at other times, especially in the case of Baldwins, the surface is pitted with

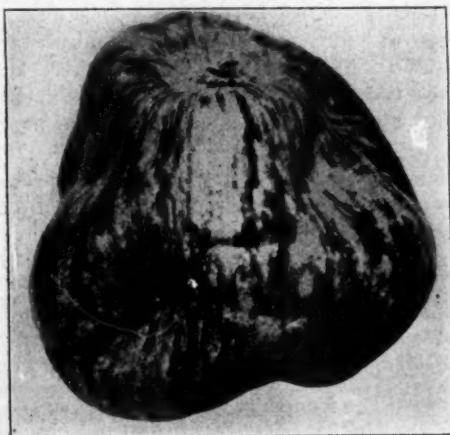


Fig. 4.—Duchess Apple deformed by a very severe attack of Bitter Pit Disease.

small depressed areas that are at first somewhat darker in colour than the rest of the epidermis and later turn brown; in still other cases the injury inside the fruit is so severe that the whole apple becomes much distorted and unfit for use. This last kind of injury is not nearly so common as either of the others.

Imperfect Fertilization.—If during the blossom period one or more of the pistils of the fruit fails to be fertilized the result is often a lop-sided or malformed fruit.

Spray Injury.—Sometimes spray mixtures, especially Bordeaux, injures a portion of the epidermis of a young fruit and, if the injury is sufficiently deep, will cause an interruption in the growth of that side and consequently a deformity. The failure of the surface over these injuries to keep pace with the growth of the tissues beneath often leads to its becoming cracked.

A NEW SPECIES OF THE GENUS NEPHROCERUS.

BY CHARLES W. JOHNSON, BOSTON, MASS.

The determination of the two American species of this genus has presented some difficulties owing to the dearth of material and to their close resemblance to some of the European species. Through the kindness of Mr. Frederick Knab, I have been able to study both sexes of *N. daekei* and the specimen of the undescribed species collected by Mrs. A. T. Slosson, on Mt. Washington, N. H., in 1897. During the past two seasons six specimens of the latter have been collected, thus giving ample material to define more clearly our two species.

The following table, including the three European species will show some of the structural characters separating them from the American species:—

TABLE OF SPECIES.

1. Last tarsal joints of all the legs without conspicuously long, bristly hairs, arista entirely black..... *lapponica* Zett.
Last tarsal joints of all the legs with 4-7 long, bristly hairs..... 2
2. Hind tibiæ rather twisted, widened at the end, and with a circle of bristles at the tip..... *flavicornis* Zett.

February, 1915

Hind tibiae simple, not noticeably widened at the ends, and without a circle of bristles at the tip..... 3

3. Arista entirely black, third joint of the antennae small, brown..... *scutellatus* Macq.

Arista with the thickened basal portion yellow, antennae entirely bright yellow..... 4

4. Abdomen with two distinct bands in both sexes; upper half of front of female linear..... *daeckei* Johns.

Abdomen indistinctly banded in the male, in the female the lateral margins are yellow, upper half of the front of the female not linear..... *slossonae* sp. n.

***Nephrocerus daeckei* Johnson.**

N. daeckei Johns., Ent. News, Vol. XIV, p. 107, 1903.

In this species the sexes are so similar that one of the co-types before me was inadvertently referred to as a male, probably because the front is so narrow. For about one-half its length it is a mere line. The sides of the first and the posterior margins of the second and third abdominal segments are widely margined with yellow. The wings are proportionately broader and not of equal width as in the following species.

In addition to the types from Richmond Hill, Long Island, N. Y., July 2, 1901, I have examined two males from Plummer's Island, Md., June 29, 1913 (R. E. Shannon), and one female, Franconia, N. H. (Mrs. Slosson) in the U. S. National Museum.

***Nephrocerus slossonae*, sp. n.**

Nephrocerus, n. sp. Ent. News, Vol. VIII, p. 237, 1897.

Male.—Face and front covered with silvery white tomentum, vertical triangle and occiput black, grayish pruinose, occipital orbits deeply emarginate, mouth parts and antennae light yellow, arista black, the thickened base light yellow. Thorax, discal portion black, shining, the anterior third covered with a grayish bloom, humeri, broad lateral stripes, and the scutellum, yellow, the latter much darker than the humeri, pleura livid, a lighter

area below the base of the wing bearing a small black spot, metanotum black. Abdomen black, shining, thinly covered with quite long yellow hair, with conspicuous tufts on the sides of the first segment, sides of the first and the posterior margins of the second and third segments brownish, hypopygium brown, the two large rounded glands diverted to the right, with a black, spirally coiled "flagellum" below. Legs and halteres light yellow, the long bristles at the end of the last tarsal joints four in number, posterior tibiae nearly straight, not noticeably thickened and without bristles. Wings long, narrow, of nearly equal width, grayish hyaline, posterior branch of the fifth longitudinal vein scarcely reaching the margin, tegulae yellow.

Length 8 mm., wing 9 mm.

Female.—Front narrow below the vertex, gradually widening above the antennae, about four times its width at the vertex. Thorax similar to that of the male except that the pleura are light yellow with small black point below the base of the wing, and black spots between the coxae, disc of the scutellum and the metanotum blackish. Abdomen dark yellow, with an irregular, broad dorsal line of black constricted at the margins and covering about one-third of each of the first five segments, the fourth and fifth segments also narrowly margined posteriorly with black, sixth and seventh segments and the hook-like ovipositor entirely yellow.

Length 7.5, wing 8.5 mm.

Five males and two females. Holotype, allotype and one paratype, Bretton Woods, N. H., June 25 and 28, 1913 (C. W. Johnson), and one paratype (σ), Mt. Washington above Base Station, N. H., July 4, 1914 (C. A. Frost), in the collection of the Boston Society of Natural History. One paratype (σ) summit of Mt. Washington (Mrs. Slosson) in U. S. National Museum. One paratype (σ) Bretton Woods, June 28, in Museum of Comparative Zoology, and one (σ) Mt. Washington above Base Station, July 4, in the author's collection. The specimens collected by Mrs. Slosson and one of those collected by Mr. Frost have the abdomen entirely black.

AN IMPORTED RED SPIDER ATTACKING FRUIT TREES.

BY L. CAESAR, PROVINCIAL ENTOMOLOGIST, GUELPH, ONT.

For some time the writer had suspected that the Red Spider so common on fruit trees in Ontario was not our common species, *Tetranychus bimaculatus*. Accordingly specimens were sent in September, 1912, to Mr. Nathan Banks of the Bureau of Entomology, Washington, D. C., with some details as to the extent of its distribution and the food plants attacked. In reply Mr. Banks stated that the species was *Tetranychus pilosus*, an European species that attacks fruit trees, and that its relationship to *Tetranychus mytilaspidis*, which feeds chiefly on oranges, was very close and, perhaps, identical.

Tetranychus pilosus is about the same size as *bimaculatus*, but differs from it in several respects:—It is more nearly circular in

outline, somewhat stouter and has a number of distinct white tubercles on the dorsal surface, with a fine hair arising from each. It is dark red in colour, many specimens being blackish, with the mouth parts and usually a dorsal longitudinal area much paler than the rest of the upper surface, whereas the colour of *T. bimaculatus* varies from greenish yellow to red. The latter species feeds largely on the lower surface beneath a fine silken web, in or under the protection of which it lays its eggs; the former feeds and lays its eggs on both

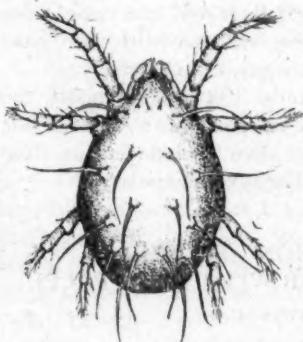


Fig. 5.—*Tetranychus pilosus*, adult female,
greatly enlarged.
(Drawn by Miss M. Hearle.)

surfaces, and makes no web, but fastens its eggs by a few fine silken threads to the leaf or twig on which they are laid. The eggs are uniformly blood red, while those of *bimaculatus* are pearly white. *T. pilosus* passes the winter in the egg stage, these being deposited in the axils of the twigs and branches. *T. bimaculatus* passes the winter as adults in the ground or in sheltered hiding places.

The host plants of *T. pilosus* so far as observed are the European plum, apple, sour cherry, pear, peach and hawthorn. European plums are by far the favorites, with apples next and then sour cherries. Peaches and Japanese plums are very little infested. Hawthorns in a few apparently exceptional cases have been severely attacked.

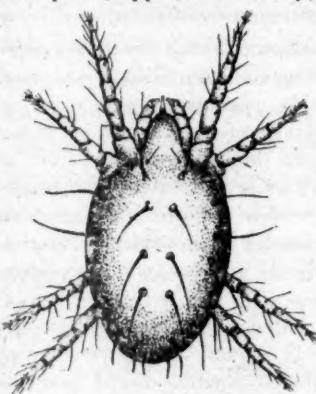


Fig. 6. — *Tetranychus bimaculatus*, adult female, greatly enlarged.
(Drawn by Miss M. Hearle.)

The foliage of badly infested trees becomes covered with numerous fine, whitish blotches very noticeable on the upper surface. After a time such leaves become brownish and at a distance of a hundred yards or more the whole of the foliage has the appearance of being covered with fine road dust.

This hitherto unrecorded Red Spider has been found by the writer in most of the fruit districts of the Province. That it has not been mentioned earlier appears to have been due to its close resemblance to our common species, *Tetranychus bimaculatus*.

GEOMETRID NOTES.—REVISION OF THE GENUS HYDRIOMENA, HUB., GROUP WITH LONG PALPI.

BY L. W. SWETT, BOSTON, MASS.

(Continued from page 11.)

17. *Hydriomena bistriolata* Zell. (Verh. zool.—bot. Ges. Wien, XXII, p. 493, 1872; Packard, Monograph, p. 95, 1876, Pl. VIII, fig. 32). This species with long palpi was placed incorrectly as a variety of *H. californiata* with which it has nothing in common. The general ground colour is dark olive-green and white. It is quite a striking species, as the entire wing seems to be surrounded with olive green and has a white mesial space. It appears like a specimen of *autumnalis* with the entire wing suffused with dark olive-green and the white central portion contrasting

sharply. There is a tendency for the extra-discal bands to unite at the inner margin of the wing. The entire outer margin is olive-green, not lighter near the outer margin as is usual. The median band is much wider than usual and the basal runs almost straight across the wing, slightly curved outward. The intradiscal band is strongly notched on the fore wing at vein 2. This seems to be a rare species and is in few collections. The specimens referred to in the Packard monograph from Kentucky and Missouri I do not think belong to this species, as the Kentucky specimen is *autumnalis*, while the Missouri specimen is not in the collection, but was probably returned to the sender, Dr. Riley, and should be in the National Museum collection at Washington. The palpi are very stout and the head is rather broad, so that it could not possibly be confused with *autumnalis*, and how it should be referred to the latter I cannot guess. I believe it is strictly Texan.

Types.—1 ♂ 10, Dallas, Tex., March 16 (Boll).

Type.—1 ♀ Texas (Boll) in Zeller collection.

It is a striking species and can be confused with no other.

18. **Hydriomena regulata** Pears. (Proc. Ent. Soc. Wash., Vol. XI, p. 131, 1909).

This is a peculiar species with olive and liver coloured shadings and has a little less than usual the general appearance of the Hydriomena group. The markings are not common for the Hydriomena, as I know of no other with liver coloured shadings, and I believe it to be rare, as the specimens in Mr. R. F. Pearsall's collection are all I have seen. It has no discal spots on primaries, the secondaries dusky and shaded with yellow brown.

Types.—2 ♂'s, Douglas Ariz., Aug. 22 and 23, 1908.

19. **Hydriomena edenata** Swett. (Can. Ent., Vol. XLI, p. 232, July, 1909).

This species is a large broad-winged one, on the pattern of *ruberata* Freger. It has a wide black bar just above inner margin of primaries which serves to separate it from *ruberata*, besides the other differences which I have already pointed out in the description. There is an error in the original description (Can. Ent., vol. XLI, p. 232, July, 1909), which I overlooked until now. Instead of "5 males" read "5 females," and instead of

"Eden Vale, Colo." read "Eden Vale, Calif." This species seems to have quite a wide range and is more common than the others. I had specimens from Mr. E. H. Blackmore, Victoria, B. C., and have heard that a specimen was even taken in Newfoundland, but cannot verify it.

Type.—1 ♀ in my collection, 4 ♀s, Mr. Broadwell's collection; 1 ♂ in Mr. J. G. Grossbeck's collection, which was sent me to compare.

H. edenata is an early species on the wing, occurring from April 5 to May 4, 1913, at Victoria.

20. **Hydriomena chiricahuata** Swett (Can. Ent., Vol. XLI, p. 231, July, 1909, Barnes and McD., Contrib. Nat. Hist. Lepid. North Am., Vol. I, No. 4, 1912.)

This species is figured by Drs. Barnes and McD. in their valuable work, in which a clear idea of the markings is given. It is quite a small and slender species and has a peculiar narrow mesial line, and the line on hind wings show only as dots. This is a very rare species and does not approach any other very closely, unless it looks superficially like a small *barnesata* with narrow mesial space.

Types.—2 ♂, Huachuca Mts. and Chiricahua Mts., Ariz., in Dr. Barnes' collection.

20. **Hydriomena similaris** Hulst, Trans. Amer. Ent. Soc., Vol. XXIII, 1896, p. 284.

This species is very closely allied to *ruberata*, from which it is difficult to distinguish. There is a peculiar pale blue and faded rusty look to the bands in *similaris*, while in *ruberata* they are bold and well defined and either smoky or brick red as the type species. *Similaris* occurs in June and July, while *ruberata*, to my knowledge, is only found in early May. This is rather a common form in Nevada, and, strange to say, is correctly labelled in most collections. How far it varies I cannot say, as my material has been somewhat limited, though it is not a rare species.

Type.—Colorado, Mr. Graef.

22. **Hydriomena ruberata** Freyer (Neu. Beit. Schmett., Vol. I, p. 67, pl. 36, fig. 2, 1831).

This little-understood species was first determined for Rev. G. W. Taylor by Mr. Lewis B. Prout of London, England. Mr.

Wolley Dod in his list (Can. Ent., Vol. XXXVIII, p. 253, 1906) also recorded it from Alberta. It did not seem to be clearly understood in Europe, for several of the older authors speak about varieties of *autumnalis* with long palpi and reddish markings. Freiherr Von Hoyningen-Heune in the Berl. Ent. Zeit., Vol. LI, p. 255, 1906, says that it is confounded with *autumnalis* in the majority of collections in Europe. It seems strange that Guenée and Packard did not note the length of the palpi, which would have separated it at a glance. The typical *ruberata* Freyer has a rust-red shading to the bands that cross the wings and rather a narrow mesial space; the mesial band, however, is quite wide. The discal dots are small and linear, and the hind wings are light ashen with two heavy, dark curved bands. Mr. Prout believes we have the true *ruberata* here in North America, as I sent him specimens to compare with European examples, and I have also specimens from Europe in my collection, which run very close to ours. I have not compared the genitalia as yet, and until that is done we can not be sure of its standing. There are several varieties which I am inclined to think occur in North America, namely, *literata* Donov. and *griscens* Hoyningen-Heune. *Ruberata* flies to light in New England in early May, and is more common in the mountainous districts, therefore I am inclined to believe it will be met with more commonly northward.

Hydriomena ruberata var. (a) **literata** Donov. (Brit. Ins., Vol. XIV, 1808, p. 80, pl. 499, fig. 2, 1810; Speyer. Stett. Ent. Zeit., p. 171, 1872).

Literata in the plate has white spots at ends of the veins, clear mesial space with discal spot like the letter T reversed. The discal spot does not seem to me a sufficient basis upon which to establish a variety, but the author's statement that it lacks the reddish markings and is grayish, that the bands are of the colour of the wings, and that it resembles *autumnalis*, except in the palpi, appears to justify its status as a variety. A form occurs here that is grayish without the red markings, and possibly it had better be referred to this variety until more is known of *ruberata*.

Hydriomena ruberata Var. (b) **griscens** Hoyningen Heune (Berl. Ent. Zeit., Vol. LI, p. 257, 1906).

This variety is a unicolorous gray and the bands and red shadings are lacking. It is like the unicolorous variety of *autumnalis*.

Hydriomena ruberata Var. (c) **glaucata** Packard (Proc. Bost. Soc. Nat. Hist., XVI, 20, 1874; Catal. of the Phal. of California, No. 2, Boston, Dec., 1873, Pl. I, fig. 6; Monograph p. 96, 1876).

The type is not in the Museum of Comp. Zool. at Cambridge, Mass., and I suppose therefore that it was returned to Edwards, its sender, as was Packard's custom, and should be in the American Museum of Natural History, New York. There is a specimen in the Edwards collection in the American Museum, New York, that answers closely to the description and figure, but unfortunately the head is missing, the most important part. The piece torn from the wing is as in the figure and the lines correspond, but it is impossible to tell where it belongs without the head. The plate is fairly clear and the figure shows the long beak-like palpi, and Packard speaks of them particularly in the description, so we know from the description at least where the type belonged. Since *ruberata* is the only closely allied species that has reddish shaded bands, with gray and unicolorous variations, and since we know green varieties always occur with red, it seems reasonable to suppose that this is a green variety of *ruberata* or else a closely allied species. This seems hardly possible, as I have specimens which agree line for line with *glaucata*, only they lack the red shading. I received a specimen from Mr. Broadwell which was green, and agreed with *glaucata* in every respect.

This form has broad full-rounded wings with five watery bands crossing them, and has a pale green ground colour with pale ashen hind wings.

Type.—1 ♀ (Edwards), Calif., probably in American Museum of Natural History, New York.

This includes all the species and varieties so far listed, and, I hope, will help to separate the many tangles. The genus *Hydriomena*, as a whole, seems a very compact and natural group, if we exclude the heterogeneous forms. The palpi and colour scheme seem to be very constant characters, and I believe eventually the other forms will be transferred to other genera. Surely

Coenocalpe magnoliata does not belong here, but until we know the genitalia and life histories better, we had better leave them as they are. Mr. Louis B. Prout is in accord with me that the larval characters and imagoes are quite distinct from those of the other species listed under *Hydriomena*. *Hera contracta*, for example, has a strong hooked clasper, which shows it does not belong to *Hydriomena*.

In regard to life histories, very little seems to be known of the American forms, but in Europe *H. furcata*, *autumnalis* and *ruberata* have been bred for years.

I take this opportunity of correcting two errors of sex-signs, which appeared in former papers of mine on this genus. In the description of *Hydriomena henshawi* (Can. Ent., Vol. XLIV, p. 164, 1912) instead of "Type 1 ♂, Nevada," read "Type 1 ♀, Nevada." In the description of *H. nubilofasciata* Pack. var. *cumulata* Swett (Can. Ent., Vol. XLII, p. 281, 1910), instead of "Types 2 ♂, Feb. 6, 1874, Sanzalito, Cal." read "Types 2 ♀," etc.

I realize that the task of unravelling this variable group has been a difficult one, and that my work is incomplete, but I hope that I have at least made some of the puzzling forms more easily recognizable to the average collector.

SYNOPSIS OF SPECIES AND VARIETIES.

14. *Hydriomena speciosata* Pack.—Green and white mottled.
Var. *agassizi* Swett.—Black and green.
Var. *taylori* Swett.—Green and brown.
15. *Hydriomena costipunctata* Barnes and McD.—Green and brownish purple.
16. *Hydriomena barpesata* Swett.—Green and white.
17. *Hydriomena bistriolata* Zell.—Green suffused, white mesial space.
18. *Hydriomena regulata* Pears.—Green and liver coloured.
19. *Hydriomena edenata* Swett.—Green and white (black bar).
20. *Hydriomena chiricahuata* Swett.—Green and white, narrow mesial band.
21. *Hydriomena similaris* Hulst.—Green with bluish bands.
22. *Hydriomena ruberata* Freyer.—Gray with reddish shaded bands.

22. *Hydriomena* var. *literata* Donov.—Gray, bands unicolorous.
Var. *griscens* Hoyn.-Heune.—Gray suffused, without bands.

Var. *glaucata* Pack.—Pale green, with gray bands.

GEOMETRID NOTES—DESCRIPTION OF A NEW VARIETY.

BY L. W. SWETT, BOSTON, MASS.

Hydriomena speciosata Pack., var. *ameliata*, n. var.

Expanse 31-33 mm. Palpi long and blackish; head and thorax greenish; abdomen light ashen. A narrow black bar at base of antennae. Fore wings olive green, with a broad white mesial band. Base of wings blackish, with possibly the beginning of a black line; between base and first line of mesial band olive green, then another olive green space to the broad irregular black band, then olive green to the intra-discal band. The three irregular lines of the mesial band are very striking; the outer one nearest the discal dot projects outward on median vein, almost touching the dot, and is irregular on the veins. Beyond, the mesial space is greenish white, giving the insect a striking appearance. In some respects it resembles certain varieties of *H. autumnalis* that I have seen from Germany. The extra-discal line is very prominent on the costa and then runs irregularly in dashes across to the inner margin. Half-way between tip of wing and extra-discal line is a broad triangular black spot, which appears to be a broken line running in spots on the veins across the wing. A broad apical black dash. Fringe black and white checkered. Hind wings dark ashen brown with a pale checkered fringe. Wings beneath dark brown, with markings of upper side showing through.

This is the white-banded form that we should expect to find, according to my colour-scheme (vide p. 63), and I should not have described it were it not for its similarity to certain varieties of *H. autumnalis*, from which it can be distinguished by the long palpi.

Type.—1 ♀, Victoria, B. C., July 7, 1914. From Mr. E. H. Blackmore, to whose collection it belongs. It was taken at Garden City, a suburb of Victoria.

Paratype.—1 ♀, Victoria, B. C., July 9, 1914, in my collection, received through the kindness of the collector, Mr. E. H. Blackmore. It was taken at Swan Lake, a suburb of Victoria.

A NEW SPECIES OF THE MYMARID GENUS CAMPTOPTERA FOERSTER FROM AUSTRALIA.

BY A. A. GIRAULT, NELSON (CAIRNS), N. Q., AUSTRALIA.

Hymenoptera Chalcidoidea.

Family Mymaridae.

Genus *Camptoptera* Foerster.

Camptoptera gregi, new species.

Normal position.

Female.—Length 0.40 mm. Minute.

Ashy black, the abdomen greyish, except toward tip; legs pallid yellowish, the antennæ ashy black, the scape and pedicel somewhat paler; both wings obscurely fumated throughout. Differing at once from the North American *pulla* and the European *papaveris*, the only other members of the genus, in having the first funicle joint abruptly shorter than the second, not long and nearly equal to it as in those species, but less than half the length of the second joint and distinctly shorter than the pedicel; also, *gregi* is smaller than *pulla* and has the abdomen paler; the first funicle joint is distinctly the shortest of the antennæ. Otherwise as in *pulla* or nearly.

(From one specimen, 2-3 inch objective, 1 inch optic, Bausch and Lomb.)

Male.—Not known.

Described from a single female specimen captured from the window of a residence at Nelson (Cairns), North Queensland, December 27, 1912 (A. P. Dodd).

Habitat.—Australia—Nelson, Queensland.

Type.—No. Hy 1343, Queensland Museum, Brisbane, the foregoing specimen on a slide.

On February 12, 1913, 9 females were captured in the same place.

Respectfully dedicated to Mr. G. R. Greg for his "The Creed of Christendom."

BOOK REVIEW.

THE ACRIDIIDÆ OF MINNESOTA. By M. P. Somes, University of Minnesota, Agricultural Experiment Station. Bulletin 141. University Farm, July 1914. 100 pp., 4 pls. (3 coloured).

Although a descriptive account of the Orthoptera of Minnesota has already been published* the present bulletin on the family Acriidiidæ or short-horned grasshoppers will be found to contain much additional information on the distribution, habitats and life-histories of the species described in the earlier work, as well as descriptive notes on 16 species not included in the latter. It also contains keys for the identification of the subfamilies, genera and species.

No fewer than 78 species are listed, a number which exceeds the Ontario list by 30 species; but this is not surprising in view of the geographical position of the state and its relations to the Mississippi Valley and to Lake Superior. Minnesota lies on the borderland between the prairies and the eastern forest region, so that the rich prairie fauna, which is an almost negligible quantity in Ontario, is abundantly represented here, while Carolinian species enter by the Mississippi Valley and Canadian species find their way into the northern counties, the proximity of Lake Superior probably favouring the boreal element in the fauna of this section.

On account of these relations it is to be regretted that the author has not given us some account of the topography of Minnesota from the standpoint of locust distribution, particularly as this phase of the subject was also ignored in Lugger's report.

Many interesting notes are given on the manner of flight, habits of oviposition, etc., of the various species, one of the most noteworthy being the observation of a female of *Melanoplus blatchleyi* in the act of drilling a hole in a piece of dead wood after the manner of *Chloealetis conspersa*, a habit unusual among the Melanoplidi.

The figures on the plates are all from original drawings, mostly in colour and, with a few exceptions, are fairly accurate and very attractive in appearance. The figure of *Arphia sulphurea*, however,

*Lugger, Otto. The Orthoptera of Minnesota. Third Am. Rept. of the Entomologist of the State Experiment Station of the University of Minnesota, 1897.

appears to be a composite of two species, the head and thorax resembling an *Arphia* fairly closely, but the wings belonging unmistakably to *Circolettix verruculatus*. A number of photographs of habitats and several maps showing the distribution of certain species also appear as text figures.

The following somewhat misleading statements have been noted in the text:

On p. 22 the author states that Bemidji, Minn., where *Chloëaltis abdominalis* was taken, "is doubtless near the eastern extreme of the range of this species, which has hitherto been taken in Montana and North Dakota." This species has been recorded from several localities in Ontario and Northern Michigan, ranging eastward beyond Georgian Bay.

On p. 23 *Dichromorpha viridis* is stated to be "common throughout North America," whereas it has never been reported from any part of Canada.

On p. 26 *Mecostethus lineatus* is spoken of as a very rare insect, ranging from New England to Northern Indiana, Illinois and Iona." In Canada it ranges northward at least as far as Anticosti Island, Temagami District, Ont., and Nipigon, Ont., and is abundant in almost all open marshes in Central and Southern Ontario.

On p. 30 *Gomphocerus clepsydra* is treated as a distinct species from *G. clavatus*, whereas it has for some years been generally regarded as a synonym of the latter.

These are minor matters and detract but little from the value of a useful and interesting account of this attractive group of insects.

SOME SOUTH INDIAN INSECTS AND OTHER ANIMALS OF IMPORTANCE.

By T. Bainbrigge Fletcher, Imperial Entomologist to the Government of India. Printed by the Superintendent, Government Press, Madras, South India, 1914.

As a worthy sequel to "Indian Insect Life," published in 1910 by Maxwell Lefroy, we have this book on the commoner insects of South India, with particular reference to economic forms. It is the first book of its kind produced in South India, and only the second in the whole country, and as such deserves special credit.

It is a quarto volume of 565 pages, and is illustrated with 50 splendid plates and 440 text illustrations. Most of the plates are coloured, and it speaks well for the author and his staff that these profuse, and on the whole, excellent illustrations are mostly original.

The work covers a very wide field, and may be divided into two parts. The first nine chapters deal with insects in general, their zoological status, structure and classification, their habits and the laws which govern them; and the tenth and eleventh chapters deal with pests in general and various means of control, specially adapted to local conditions. Then follow general descriptions of different insects classified as pests of crops and grain, as household pests and as carriers of disease, and the extent to which some are beneficial and useful. One chapter is devoted to a few other animals and birds, both beneficial and injurious. An important section, and one which will be valuable to its readers, is a long list of the commonly-grown plants and crops, with the names of some 800 insects attacking them, and a list of allied plants grouped under natural orders for reference when studying polyphagous insects.

The second and main part of the book is taken up with a study of the orders of insects, dealing mainly with injurious forms under the headings of references, distribution in South India, life-history, food plants, economic status and means of control. This represents an enormous amount of information condensed to a systematic and readily available form, and the profuse illustrations are intended to facilitate the tracing out of any particular insects which may prove injurious. The fact that many of the life-histories are classed as "not worked out" should be a stimulus to entomologists in India. The book ends with a complete index.

The author is to be congratulated on a stupendous work which he confesses was undertaken unexpectedly and executed largely by the exertions of the Madras Department of Entomology in the short space of two years. As a handy and popular work on insects, the book should prove of great value to planters and those interested in entomology, and the low price of six rupees (two dollars) places it within the reach of most people.

G. J. SPENCER.

Mailed February 11th, 1915.

